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Yoshihiro Kawano

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EXAMINER

WILLIAMS, DON J

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 10/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/682,236

Applicant(s)

KAWANO ET AL.

Examiner

Don Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/8/2004</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-16 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of MacAulay et al (6,663,560).

As to claim 1, Iwasaki discloses a scanning optical microscope having a laser beam source (10), at least one lens (15, 18) for converging beams of light (11A, 11B) of different cross-sectional shape aspect ratio to create a linear or collimated light (11A, 11B), a first light modulation member (13A, 13B) for imparting shade to the converged linear light (11A, 11B), a lens (15, 18) for forming the light (11A, 11B) to impart shade as a parallel light (11A, 11B), one scanning member (14) that scans in a X-Y-Z direction corresponding to being capable of scanning in a vertical and horizontal direction of the linear light (11A, 11B), the scanning member (14) being disposed between the first light modulation member (13A, 13B) and a sample (20), at least one lens (18) for focusing the light (11A, 11B) to which the shade has been imparted to the sample body (20), and at least one lens (22) for imaging the reflected light (11A, 11B or 11') from the sample body (20) or the light generated by the sample body (20) on a light detecting element (25), (see figure 1, column 3, lines 50-68, column 4, lines 1-20, lines 37-67). Iwasaki

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fails to explicitly disclose a lens member for altering the cross-sectional shape aspect ratio of a beam of light emitted from the light source and a first light modulation member being disposed to a lens such that the linear light is incident on the first modulation member. MacAulay et al disclose (fig. 3) a lens member (lens) for altering the cross-sectional shape aspect ratio of a beam of light emitted from the light source (4) and a spatial light modulation member (8) being disposed to a lens (40) such that the linear light is incident on the spatial light modulation member (8). It would have been obvious for one ordinary skill in the art to modify Iwasaki to include lenses along the light path to alter or change the cross-sectional shape of the linear light and to enhance the focus of the linear light onto the modulation member as disclosed by MacAulay et al in order to improve the ability to distinguish and detect the modulated light images.

As to claim 2, the modified Iwasaki discloses that the light detection element is a photodetector (25), (see figure 1, column 4, lines 45-47).

As to claim 3, the modified Iwasaki discloses that the illumination light source is a laser beam (11), (see figure 1, column 3, lines 50-67).

As to claim 4, the modified Iwasaki further discloses that MacAulay et al, (column 9, lines 50-55) set forth a white light source, an arc lamp or a laser. The modified Iwasaki fails to explicitly disclose the exact group as claimed consist of a high pressure mercury lamp, xenon lamp, halogen lamp, and a metal halide lamp. It would have been obvious for one ordinary skill in the art to further modify Iwasaki in view of MacAulay et al to replace the white light source or a xenon arc lamp with any selected from the claimed group since they are functionally equivalent means of illuminating a sample.

As to claim 5, the modified Iwasaki discloses a second light modulation member (13A, 13B) that can impart a confocal effect or light spot (P) to light (11A, 11B) from the sample body (20), and the confocal effect or light spot (P) can be optimized or reduced by changing one of the beam diameter (11A, 11B) and number of the beams (11A, 11B) of the light transmitted through the light modulation member (13A, 13B), (see figure 1, column 3, lines 50-67, column 4, lines 53-67).

As to claim 6, the modified Iwasaki discloses a computer (24, 28) for controlling the start and stopping operations and the regulation of the scanning speed of the scanning member (14), a computer (24, 27A, 27B) for controlling the illumination pattern of the light modulation member (13A, 13B), and the on/off irradiation of the illumination light (11A, 11B) on the sample body (20), (see figure 1, column 5, lines 5-15).

As to claim 7, the modified Iwasaki discloses (fig. 2, column 4, lines 24-36) interference fringes (17) being formed by the splitting of the light (11) from the light source (10) into a plurality of beams (11A, 11B) and the interference (17) of the plurality of beams (11A, 11B), and a lens (15) and an optical member (18) necessary for the formation of the interference fringes (17). The modified Iwasaki further discloses that MacAulay et al (see column 8, lines 13-35, column 20, lines 56-67) disclose a digital mirror device having a plurality of reflecting mirrors that are capable of being switched on and off wherein each mirror does not reflect incident light (11A, 11B) when in the off state and reflects incident light (11A, 11B) when in the on state. The modified Iwasaki fails to explicitly disclose a diffraction grating. The modified Iwasaki does disclose a beam splitter that splits light (11) into a plurality of linear laser beams (11A, 11B), (see

figure 1, column 3, lines 52-55). It would have been obvious for one ordinary skill in the art to further modify Iwasaki in view of MacAulay et al to use the beam splitter as a diffraction grating in order to improve the interference fringes by splitting the light into linear separate laser beams.

As to claim 8, the modified Iwasaki further discloses that MacAulay et al (fig. 1, column 8, lines 13-39) sets forth a one dimensional mirror array consisting of two or more micro electro mechanical system (MEMS) which are well known in the art as spatial light modulators (SLM).

As to claim 9, the modified Iwasaki further discloses that MacAulay et al (fig. 1, column 8, lines 13-39) set forth a liquid crystal plate having a changeable transmissivity and a SLM (spatial light modulator).

As to claim 10, the modified Iwasaki discloses that the scanning member (14) is a galvanometer mirror and wherein the position of a single point illumination light (11A, 11B) can be shifted temporally by controlling the light modulation member (13A, 13B) in which the shade pattern is alterable, (see figure 1, column 5, lines 13-18).

As to claim 11, the modified Iwasaki further discloses that MacAulay et al (fig. 3, column 8, lines 12-43) set forth that the light modulation member (8) has means for imparting of various alterable shade patterns or spots in which the shade pattern or spots are alterable, wherein a confocal image is produced by a plurality of points and the sample body (22) can be simultaneously illuminated.

As to claim 12, the modified Iwasaki further discloses that MacAulay set forth (fig. 3, column 8, lines 12-43) set forth that the modulation member is capable of altering a

shade wherein one segment of the visual field is simultaneously illuminated and the sample body (22) is scanned with a linear light.

As to claim 13, the modified Iwasaki further discloses that MacAulay (fig. 3) set forth that the lens member (lens) alters the cross-sectional shape ratio of the light beam emitted from the light source (4) comprises one or more cylindrical lens (lens).

As to claim 14, the modified Iwasaki discloses a scanning member comprise a galvanometer (14), (see figure 1, column 3, lines 55-65).

As to claim 15, the modified Iwasaki discloses that the sample body (20) is scanned several times by a linear illumination lights (11A, 11B) of different shade pattern and one image (Q) is produced from the plurality of scanned data (see figure 1, column 4, lines 53-67).

As to claim 16, the modified Iwasaki discloses (fig. 1, column 3, lines 52-54) that the illumination light source comprises a laser (10) and a laser beam (11). The modified Iwasaki further disclose that MacAulay (fig. 1, column 10, lines 55-67)) sets forth that the light beam is introduced into the lens member (20) through a fiber (14).

As to claim 20, the modified Iwasaki further discloses that MacAulay (column 1, lines 20-30, column 8, lines 40-50) set forth Raman spectrum.

As to claim 21, the modified Iwasaki further discloses that MacAulay (column 9, lines 25-36, column 16, lines 29-30) set forth a two-dimensional imaging device (CCD).

As to claims 22-24, the modified Iwasaki further discloses that MacAulay (fig. 1, column 7, lines 4-42, column 9, lines 23-40) set forth a (CCD) charge couple device camera. MacAulay et al fail to disclose the exact type of CCD camera or detecting

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elements claimed. It would have been obvious for one ordinary skill in the art to replace the CCD camera of MacAulay with any selected from the claimed group since they are functionally equivalent as means of detecting light from a sample.

As to claim 25, the modified Iwasaki discloses that the condensing lens (22) is a means for focusing a plurality of different wavelengths (11A, 11B) on the light detecting element (25), (see figure 1, column 4, lines 36-49).

Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwasaki in view of MacAulay et al and further in view of Hoffman et al (US2002/0024015).

As to claim 17, the modified Iwasaki further discloses that MacAulay (column 8, lines 40-56) set forth a fluorescent sample body (22). The modified Iwasaki fails to disclose the use of an ultra short pulse laser, multi-photon excitation with two photon and three photon excitation. Hoffmann et al disclose an ultra short pulse laser, a multi-photon excitation with a two photon and a three photon excitation. It would have been obvious for one ordinary skill in the art to further modify Iwasaki in view of MacAulay to include an ultra short pulse laser, a multi-photon excitation comprising of two photon and three photon excitation as disclosed by Hoffman et al to illuminate the sample in order to improve and obtain a clear and precise image, (see paragraph [003]).

As to claim 18, the modified Iwasaki discloses a laser beam source (10). The modified Iwasaki fails to explicitly disclose a titanium sapphire laser. Hoffmann et al disclose a titanium sapphire laser, (paragraph [003]). It would have been obvious for



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one ordinary skill in the art to further modify Iwasaki in view of MacAulay to include a titanium sapphire laser as disclosed by Hoffmann et al to excite the sample in order to obtain a clear optical image.

As to claim 19, the modified Iwasaki discloses a photodetector (25), a sample body (20), and modulation member (13A, 13B), (see fig. 1, column 3, lines 55-60, column 4, lines 45-50). The modified Iwasaki fails to disclose a spectral diffraction device, and a prism. Hoffmann et al disclose grating pair (14, 15) and prisms (16, 17), (paragraph [0047]). It would have been obvious for one ordinary skill in the art to modify Iwasaki to use a grating pair as a spectral diffraction device along with the prisms to split or spread the scanning beam as disclosed by Hoffmann et al to increase the optical efficiency in order to acquire a precise light spot on the sample when being scanned.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Don Williams whose telephone number is 571-272-8538. The examiner can normally be reached on 8:30a.m. to 5:30a.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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